

## A SYNOPSIS OF BERBERIS SECTION WALLICHIANAE

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**ABSTRACT.** A synopsis of the 75 species recognized in the asiatic section *Wallichianae* of the genus *Berberis* is provided with the relevant synonymy and keys. Two taxa are described as new: *Berberis hookeri* Lemaire subsp. *longipes* Chamberlain & Hu and *B. lijiangensis* Chamberlain & Hu. In addition there are several new combinations and changes of rank.

A new classification of sect. *Wallichianae* is proposed and the characters on which it is based are discussed.

### INTRODUCTION

The genus *Berberis* has two centres of distribution: in the New World it extends along the Andean chain of mountains, and in the Old World the majority of the species are centred on the Himalayas in a region extending from Pakistan to W China and on into C & S China.

The most recent complete monograph of *Berberis* was published in 1961 as an extensively edited version of notes left by Ahrendt on his death. This undoubtedly accounts for many of the difficulties that this work presents, not least in the identification of both dried and living material. Furthermore, a number of species are widely cultivated. For these reasons a new revision of the Old World species of the genus has been started.

Sect. *Wallichianae* as delimited by Ahrendt is a well-defined natural group of species, the circumscription of which is not disputed. A synopsis of the species of this section as recognized by the present authors is presented here as a precursor of a further monographic treatment to be published in the future.

Schneider (1905) created sect. *Wallichianae* and subsequently published many descriptions of new species in this section, mainly from W China. Based on this work he finally published a monograph of sect. *Wallichianae* (1942) in which he recognized 71 species in 8 subsections. While the delimitation and description of species was on the whole precise and reliable, his subsections seem to us to have been based on characters that can, in some instances, vary, even within a single species. Some of these subsections contain species that differ from one another in many respects, whereas closely allied species with similar geographical distributions are allotted to different subsections. These subsections may therefore be considered to be totally artificial.

Ahrendt (1941) published a comprehensive account of *Berberis* in which he divided sect. *Wallichianae* into 12 subsections with 79 species, of which 8 were new. By the time his 1961 monograph appeared there were 14 subsections and 91 species. Ahrendt's prime interest in the genus was horticultural and his species concept was clearly influenced by the plants then in cultivation. This may have led him to a narrower species concept than that used in the present synopsis. In view of the possibility of hybridization in cultivation we have only considered those taxa that are represented in the wild and have excluded those that are only known in cultivation.

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Although Ahrendt's monograph is an important contribution to the study of *Berberis* we have found that the account has a number of inconsistencies, both in the descriptions and in the citation of types. Furthermore, the keys are extremely difficult to use, even for specimens actually cited by Ahrendt. The classifications of both Ahrendt and Schneider are at least partly based on vegetative characters such as the size, shape, texture, venation and margin of the leaves and the cross-section and colour of the young shoots. These characters prove to be so variable, sometimes even between different shoots of the same plant, as to be unreliable as diagnostic characters above species level. We therefore propose an extensively revised classification for sect. *Wallichianae* based largely on floral characters.

Investigation of the ovaries of species in this section has shown that there are three basic types. In subsect. *Hookerianae* the ovular bundles ascend the inner surface of the ovary wall from the base of the placenta and are parallel with the ventral bundles of the ovary, forming a semi-basal placenta. The placenta always bears several (4-15) ovules. Thus the ovary walls tend to be thick, especially at the base, and they often restrict the ovary cavity (Fig. 1e). This type is assumed to be derived from one with a parietal placenta and may be considered to be primitive.

In subsect. *Wallichianae* the placenta is truly basal and bears only 1-4 ovules (Fig. 1f, g). The ovary wall tends to be thinner than in subsect. *Hookerianae* and the ovary cavity is generally larger. The funicle is comparatively short, being one to two times as long as the ovule.

In the monotypic subsect. *Subleves* the ovary cavity and placenta, with its single ovule, are as in subsect. *Wallichianae*. The funicle however is five to six times as long as the ovule (Fig. 1h) and by the time the fruit is ripe the hilum is at the upper part of the seed and not basal as in the other two subsections (cf. Fig. 1i, j).

There are two basic types of anther in sect. *Wallichianae* and these are closely correlated with the ovary characters previously described. In subsections *Wallichianae* and *Subleves* the anthers are narrowly oblong and terete, seldom broader than the filaments, and they have a truncate apex (Fig. 1b-d). Those of subsect. *Hookerianae* are usually broadly oblong and square and flattened, with the connective truncate apex broader than the filament (Fig. 1a). *Berberis insignis* and *B. asmyana*, both members of subsect. *Hookerianae* on the basis of the ovary characters, are exceptional in that their anthers resemble those of subsections *Wallichianae* and *Subleves*.

In subsect. *Hookerianae* the petals tend to be orbicular to broadly obovate and concave whilst in the other two subsections they are obovate to narrowly obovate, but here the correlation is not as close.

The form of the ovary, the ovule number, anther and petal shape appear to be the most consistently linked characters and it is on these characters that the three subsections and ten series recognized here are based. This account therefore presents an extensively revised classification of subsect. *Wallichianae*.

*B. osmastonii* is excluded as it appears to be a totally anomalous species in this section. Until the remaining old world species are revised its true affinities remain uncertain. For a further discussion of this species see Ahrendt (1961, p. 41).

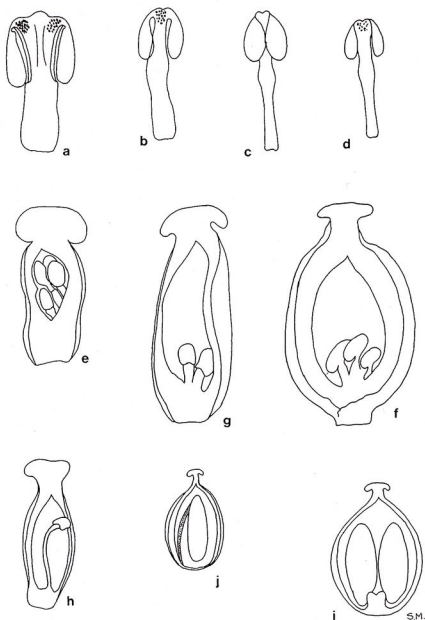


FIG. 1. *Berberis* sect. *Wallichianae*. a-d, stamens; e-h, L.S. of ovaries; i & j, L.S. of berries showing seeds.

Subsect. *Hookerianae*: a & e, *B. hookeri*.

Subsect. *Wallichianae*: b & f, *B. pruinosa*; c, g & i, *B. dumicola*.

Subsect. *Sublevis*: d, h & j, *B. sublevis*.

1. Section **Wallichianae** Schneider in Bull. Herb. Boiss. sér. 2, 5:400 (1905).

Leaves evergreen, thinly or thickly coriaceous, with or without hypoderm. Flowers pale or bright yellow, solitary, in fascicles or rarely in 2-3-flowered racemes arranged in fascicles. Ovules 1-12(-15). Fruit  $\pm$  solid, with seed set in a dry pithy interior. Style absent or very short, not exceeding 0.5mm.

Type species: *B. wallichiana* DC.

Sect. *Wallichianae* is a natural group that can be divided into subsections:

1. Ovules solitary; funicle 3-6  $\times$  as long as the ovule; hilum at the upper part of the seed . . . . . subsection. **Subleves**  
 + Ovules solitary to many; funicles short, less than twice as long as the ovule; hilum at the base of the seed . . . . . 2
2. Ovary usually with a thick wall and the lower third solid; placenta adnate to the ovary wall along the ventral suture; ovules (3-)4-15, the top one usually reaching the upper part of the ovary cavity . . . . . subsection. **Hookerianae**  
 + Ovary with thinner wall and larger cavity; placenta basal or only slightly adnate to the ovary wall; ovules 1-4(-5), the top one not exceeding the middle of the ovary . . . . . subsection. **Wallichianae**

Subsection *Hookerianae* Ahrendt in J. Bot. 79, Suppl.:12 (1941).

Leaves usually thickly coriaceous. Flowers solitary or in fascicles; sepals broadly obovate to orbicular, usually thick and very concave, turning dark when dry; ovary cylindrical, usually with a thick wall and the lower third solid; placenta adnate to the ovary wall along the ventral suture; ovules (3-)4-15, shortly stipitate, the top one usually reaching the upper part of the ovary cavity. Fruit large, oblong, rarely globose.

Type species: *B. hookeri* Lemaire

1. Flowers solitary, rarely biflorate; ovules 4-6 . . . . . 2. ser. **Verruculosae**  
 + Flowers in fascicles or, if solitary, then ovules more than 8 . . . . . 2
2. Anthers flattened, apex broadly truncate, broader than filament; fruit estylose,  $\pm$  pruinose . . . . . 1. ser. **Hookerianae**  
 + Anthers oblong, not flattened, the truncate apex as broad as the filament or narrower; fruit shortly stylose, epruinose . . . . . 3. ser. **Insignes**

1. Series **Hookerianae**

Flowers fascicled, rarely solitary; anthers flattened, apex broadly truncate, broader than the filament; fruit estylose,  $\pm$  pruinose.

1. Shoots sulcate, glabrous . . . . . 2  
 + Shoots terete or subterete,  $\pm$  verruculose . . . . . 4
2. Flowers solitary, 17-18mm diam.; ovules 9-12 . . . . . 3. **chrysosphaera**  
 + Flowers in fascicles, rarely solitary, 12-25mm diam.; ovules 4-15 . . . . . 3
3. Flowers (1-)2-3 per fascicle, c.25mm diam.; ovules 10-15 . . . . . 1. **calliantha**  
 + Flowers 3-6 per fascicle, 12-15mm diam.; ovules 4-8 . . . . . 2. **hookeri**
4. Leaves elliptic to oblong-elliptic . . . . . 5  
 + Leaves ovate-lanceolate to lanceolate . . . . . 7. **gagnepainii**

5. Leaves green below, epruinose . . . . . **4. phanera**  
 + Leaves white-pruinose below . . . . . 6
6. Fascicles 30–50-flowered; shoots purplish . . . . . **8. hsuyunensis**  
 + Fascicles 3–6-flowered; shoots yellow . . . . . 7
7. Flowers less than 12mm diam.; shoots pruinose, not or only slightly verruculose; spines terete . . . . . **5. lijiangensis**  
 + Flowers more than 12mm diam.; shoots distinctly verruculose; spines sulcate . . . . . **6. coxii**

**1. B. calliantha** Mulligan in Gard. Chron. 97:349 (1935). Type: China, S Xizang, Pemako chung, 2400–2700m, 21 xi 1924, *Kingdon-Ward* 6308 (K).

CHINA (SE Xizang, Tsangpo Gorge). Growing in masses with *Rhododendron* and in shade in the forest.

**2. B. hookeri** Lemaire in Illustr. Hort. 6:t.207 (1859).

1. Pedicels 15–25mm; flowers more than 15mm diam. **2a. subsp. hookeri**  
 + Pedicels 25–30mm; flowers less than 15mm diam. **2b. subsp. longipes**

**2a. subsp. hookeri.** Type: a cultivated plant from a garden in Ghent, Belgium (n.v.).

Syn.: *B. wallichiana* sensu Hooker in Bot. Mag 77:t.4656 (1852), non DC. (1824).

*B. hookeri* var. *viridis* Schneider in Bull. Herb. Boiss. sér. 2,8:197 (1908). Type: N India, Sikkim, Lachan valley, v 1849, *Hooker* s.n. (K).

*B. hookeri* var. *microcarpa* Ahrendt in J. Linn. Soc., Bot. 57:40 (1961). Type: N India, Sikkim, 25 x 1874, *Clarke* 25561 (K).

*B. hookeri* var. *platyphylla* Ahrendt, loc. cit. (1961). Type: N India, Sikkim, *Hooker* 40 (K).

*B. buchananii* Schneider var. *tawangensis* Ahrendt in J. Bot. 79, Suppl.: 37 (1941), **syn. nov.** Type: China, S Xizang, Monyul, Tawang, 2900m, 22 x 1934, *Ludlow & Sherriff* 1089 (holo. BM).

NEPAL, N INDIA (Sikkim, Assam), BHUTAN, CHINA (S Xizang).

**2b. subsp. longipes** Chamberlain & Hu, **subsp. nov.** (*B. buchananii* Schneider var. *tawangensis* Ahrendt, excl. typ.)

A subsp. *hookeri* pedicellis longioribus et floribus minoribus recedit.

Type: China. SE Xizang, Pomé, Tongyuk Dzong, 3000m, in *Pinus*, *Picea* and *Juniperus* forest, 20 v 1947, *Ludlow, Sherriff & Elliot* 13713 (holo. BM, iso. E).

CHINA: SE Xizang: Tongyuk Dzong, 22 xii 1946, *Ludlow, Sherriff & Elliot* 12026 (BM, E); Dem, Po Tsangpo Valley, 4 vi 1947, *Ludlow, Sherriff & Elliot* 13080 (BM, E).

Subsp. *longipes* replaces subsp. *hookeri* in SE Xizang.

*B. hookeri* is a variable species, especially in leaf shape, size and colour: there are some plants with leaves partly bright green and partly blue-green beneath. There is also no justification for maintaining the varieties distinguished by Ahrendt on the size of the fruit and the density of the teeth on the leaf margins.

3. **B. chrysophaera** Mulligan in Kew Bull. 1940:77 (1940). Type: China, SE Xizang, Dri La, Rong-to valley, 2700–3000m, xii 1923, *Kingdon-Ward* 11036 (holo. BM).

CHINA (SE Xizang). On steep south facing granite cliffs, in the open or among trees, 2700–5000m.

4. **B. phanera** Schneider in Österr. Bot. Zeit. 67:22 (1918). Type: China, SW Sichuan, N of Yanyuan, *Schneider* 1460 (iso. E).

Syn.: *B. delavayi* Schneider var. *wachinensis* Ahrendt in J. Bot. 79, Suppl.: 38 (1941), **syn. nov.** Type: China, W Sichuan, Muli, 3000m, *T. T. Yu* 14401 (E).

?*B. subcoriacea* Ahrendt in J. Linn. Soc., Bot. 57:75 (1961). Type: a plant cultivated at Wisley that flowered in 1938, reputedly raised from Forrest seed (n.v.).

CHINA (NW Yunnan, SW Sichuan). On thicket margins and stream banks, in forest, 1500–2500m.

Our knowledge of *B. subcoriacea* comes from a Delavay specimen cited by Ahrendt under that name which we consider belongs to *B. phanera*; we have not seen the type of the former species.

5. **B. lijiangensis** Chamberlain & Hu, **sp. nov.**

Species affinis *B. phanerae* Schneider, sed foliis subtus albo-pruinosis, margine spinulis paucioribus, utrinque 2–3(–4) differt.

Frutex erectus, 1–2m altus. Ramuli annotoni subteretes, leviter albo-pruinosi, vetustiores cinerascetes, subangulati. Internodia 2–4cm longa. Spinae normales, 1.5–3cm longae. Folia 4–6 fasciculata, coriacea, oblongo-elliptica vel anguste elliptica, 1.5–3cm longa, 0.8–1.5cm lata, apice acuta, basi attenuata, subsessilia, margine leviter revoluta, serrulata, spinulis c.1mm longis, utrinque 1–3(–4), 4–6(–8)mm inter se; supra viridia, leviter nitidula; subtus albo-pruinosa, dense papillosa, utraque facie venis lateralibus distincte visilibus, haud reticulata. Flores 3–6 fasciculati, flavi, 8–10mm diam. Pediceli c.15mm longi, albo-pruinosa. Bracteolae ovatae, 2.5mm longae, extus pruinosa. Sepala exteriora elliptica vel oblonga, valde concava, 3.5–5 × 2–3mm, extus leviter pruinosa, interiora obovata apice rotundata, 6 × 4.5mm. Petala obovata vel subrotundata, 4.5 × 3.2mm, apice rotundata, integra, basi haud unguiculata, glandulis 2 separatis, c.1 × 0.6mm praedita. Stamina filamenta basi petalorum leviter adnata, crassa, 3.5–4mm longa; antherae oblongae, connectivo apice dilatato et truncato. Ovarium cylindricum ovulis 4, breviter stipitatis instructum. Baccae ignotae.

Type: China, W Yunnan, eastern flank of Lijiang range, 2700–3100m, shady rocky situations in pine forest, flowers bright yellow, fragrant, v 1906, *Forrest* 2203 (holo. E, iso. K).

CHINA W Yunnan: eastern flank of Lijiang range 2700–3100m, dry open situations amongst scrub and in pine forests, flowers golden yellow, v 1906, *Forrest* 2102 (E, K); nr Lijiang, 2900–3200m, in scrub, *Schneider* 2043 (K).

6. **B. coxii** Schneider in Repert. Spec. Nov. Regni Veg. 46:261 (1939).

Type: Upper Burma, Hpimaw, *Farrer* 1030 (iso. E).

7. *B. gagnepainii* Schneider in Bull. Herb. Boiss. sér. 2:196 (1908).

1. Leaves dull green above; marginal spinules  
 2-5 per cm . . . . . 7a. var. *gagnepainii*  
 + Leaves lustrous above; marginal spinules  
 6-10 per cm . . . . . 7b. var. *omeiensis*

7a. var. *gagnepainii*. Type: China, without precise locality, vii 1903, *Wilson* 3148 (holo. P; iso. BM, K).

Syn.: *B. gagnepainii* var. *lanceifolia* Ahrendt in J. Bot. 79, Suppl.:39 (1941). Type: China, W Hubei, 1500-1800m, 16 v 1907, *Wilson* 1503 (n.v.).

*B. gagnepainii* var. *filipes* Ahrendt, loc. cit. (1941). Type: China, W Sichuan, SE of Tachien lu (Kangding), 2100-2700m, *Wilson* 1137a (holo. BM).

*B. gagnepainii* var. *lanceifolia* Ahrendt f. *pluriflora* Ahrendt in J. Linn. Soc., Bot. 57:53 (1961). Type: China, Mupin (Baoping) 1900-2400m, *Wilson* 1137 (iso. BM).

CHINA (W Hubei, Sichuan). In thickets and on cliffs, 2000-3300m.

7b. var. *omeiensis* Schneider in Repert. Spec. Nov. Regni Veg. 46:264 (1939). Type: China, Sichuan, Mt Emei, *W. P. Fang* 2926 (iso. E).

CHINA (Sichuan). Forest margins, 2200-2800m.

Of the many varieties of this species described by Ahrendt not one appears to be worthy of taxonomic recognition and all are more or less sympatric.

8. *B. hsuyunensis* Hsiao & Sung in Acta Phytotax. Sin. 12:388 (1974). Type: China, C Sichuan, Xuyong Xian, 2 vi 1964, coll. non cit. (holo. Inst. Materia Medica, Chinese Academy of Medical Sciences, Sichuan, n.v.)

CHINA (C Sichuan).

We have seen no material of this species but from the original description this is undoubtedly a distinct species in series *Hookerianae*.

2. Series *Verruculosae* (Ahrendt) Chamberlain & Hu, stat. nov.

Syn.: Subsect. *Verruculosae* Ahrendt in J. Bot. 79, Suppl.: 40 (1941).

Subsect. *Candidulae* Schneider in Mitt. Deutsch. Dendr. Ges. 55:52 (1942), p.p.

Flowers solitary, rarely paired; anthers  $\pm$  flattened, apex truncate or slightly contracted; fruit estylose, pruinose.

Type species: *B. verruculosa* Hemsley & Wilson.

1. Shoots sulcate; leaves green, epruinose below. . . . . 11. *asmyana*  
 + Shoots terete; leaves white-pruinose below . . . . . 2  
 2. Shoots distinctly verruculose; leaves elliptic or  
 ovate-elliptic . . . . . 9. *verruculosa*  
 + Shoots hardly verruculose; leaves oblong-lanceolate to  
 lanceolate . . . . . 10. *candidula*

9. *B. verruculosa* Hemsley & Wilson in Kew Bull. 1906:151 (1906). Type: China, W Sichuan, Tatsien lu (Kangding), *Wilson* 3150 (holo. K; iso. BM, P).

CHINA (W Sichuan). In woods and thickets on rocky slopes, 1300–3200m.

10. *B. candidula* Schneider in Bull. Herb. Boiss. sér. 2, 5:402 (1905). Type: China, E Sichuan, Tchen Kou Tin (Chengkou), 1896, *Farges* s.n. (n.v.).

CHINA (E Sichuan, W Hubei). In scrub on hillside, c.1200m.

11. *B. asmyana* Schneider in Sargent (ed.), Pl. Wilsonianae 1:357 (1913). Type: China, W Sichuan, Mupin (Baoping), *Wilson* 2873 (holo. A, n.v.; BM, E, K).

Known only from the type collections.

3. Series *Insignes* (Schneider) Chamberlain & Hu, stat. nov.

Syn.: Subsect. *Insignes* Schneider in Bull. Herb. Boiss. sér. 2, 5: 401 (1905), p.p.

Shoots terete; spines usually weak. Leaves large. Flowers in fascicles; anthers oblong, not flattened, apex truncate, usually as broad as filament. Ovules (3–)4–7. Fruit black, shortly stylose, epruinose or slightly pruinose. Type species: *B. insignis* Hook.f. & Thomson.

1. Leaves and fruit white-pruinose . . . . . 14. *hypokerina*  
+ Leaves and fruit epruinose . . . . . 2

2. Shoots pubescent . . . . . 12. *dasyclada*  
+ Shoots glabrous . . . . . 13. *insignis*

12. *B. dasyclada* Ahrendt in J. Bot. 79, Suppl.: 12 (1941). Type: NE India, Assam Himalaya, Poshing La, 3000m, 24 v 1938, *Kingdon-Ward* 13700 (holo. BM).

Syn.: *B. insignis* Hook. f. & Thomson var. *zelaica* Ahrendt, op. cit. 9 (1941), syn. nov. Type: NE India, Assam Himalaya, Zela, 2700–3000m, *Kingdon-Ward* 11544 (holo. BM).

NE INDIA (Arunachal Pradesh). In pine and rhododendron forest, 2700–3600m.

A distinct species easily recognized by its wart-like hairs on the branches. The original description of *B. insignis* var. *zelaica* states, apparently in error, that the shoots are glabrous.

13. *B. insignis* Hook.f. & Thomson, Fl. Ind. 226 (1855).

1. Pedicels slender or stout, not thickening towards apex; fruit usually oblong . . . . . 13a. subsp. *insignis*  
+ Pedicels slender at base thickening to 1.5mm at apex; fruit globose . . . . . 13b. subsp. *incrassata*

13a. subsp. *insignis*. Type: N India, Sikkim, *Hooker f.* s.n. (holo. K).

Syn.: *B. insignis* var. *tongloensis* Schneider in Mitt. Deutsch. Dendr. Ges. 55:45 (1940). Type: India, W Bengal, Darjeeling, *Lace* 2243 (iso. E).



*B. insignis* var. *shergaonensis* Ahrendt in J. Bot. 79, Suppl.: 8 (1941). Type: NE India, Assam Himalaya, in woods, 2400–2700m, *Kingdon-Ward* 13617 (holo. BM).

*B. insignis* var. *elegantifolia* Ahrendt in J. Linn. Soc., Bot. 57:37 (1961). Type: N India, Sikkim, Yaldong, 1849, *Hooker f.* s.n. (holo. K).

*B. insignis* var. *gouldii* Ahrendt, op. cit. 38 (1961). Type: Bhutan, 2100–3300m, 1938, *Gould* 243 (holo. K, n.v.).

NEPAL, N INDIA (W Bengal, Sikkim, Arunachal Pradesh), BHUTAN. In mixed forest and amongst rhododendrons, 2100–3300m.

**13b. subsp. *incrassata* (Ahrendt) Chamberlain & Hu, comb. et stat. nov.**

Syn.: *B. incrassata* Ahrendt in Gard. Chron. 3, 105:371 (1939). Type: Upper Burma, Adung valley, 2100m, *Kingdon-Ward* 9358 (holo. BM).

*B. incrassata* var. *bucahwangensis* Ahrendt in J. Bot. 79, Suppl.: 11 (1941). Type: China, SE Xizang, Zayul, 1600m, *T. T. Yu* 20138 (holo. E).

NE UPPER BURMA, CHINA (SE Xizang). In thickets, under bamboos and on cliffs, 1200–2100m.

The differences between the two subspecies are too slight to maintain them as separate species, but there is at least partial geographical replacement.

**14. *B. hypokerina* Airy-Shaw in Kew Bull. 1930:208 (1930). Type: Upper Burma, Seingku Wang, *Kingdon-Ward* 6787 (holo. K).**

NE UPPER BURMA. On shaded banks and granite cliffs, 2400–3000m.

**II. Subsection *Wallichianae* Schneider in Bull. Herb. Boiss. sér. 2, 5:402 (1905).**

Leaves  $\pm$  coriaceous; flowers in fascicles, rarely solitary; anthers oblong, apex truncate or obtuse, not flattened, as broad as or narrower than filament; ovary cylindrical or pear-shaped, usually with a thin wall and large cavity, placenta basal or only a little adnate to the ovary wall, ovules 1–4(–5), shortly stipitate, the top one not exceeding the middle of the ovary cavity; fruit usually ellipsoid to globose.

Type species: *B. wallichiana* DC.

1. Fruit black, shortly stylose, epruinose or slightly pruinose;  
ovules (1)–2–4; leaves distinctly veined (Taiwan, Philippines,  
Indonesia) . . . . . 4. ser. **Baranadanae**
- + Fruit markedly pruinose or if not then estylose or ovule solitary;  
leaves distinctly or indistinctly veined (Mainland of Asia) . . . . . 2
2. Leaves sub-coriaceous, flexible, epruinose; veinlets clear and  
forming a close network; fruit estylose . . . . . 3
- + Leaves sub-coriaceous to coriaceous, enervate or with lateral and  
secondary veins discernible but not forming a close network . . . . . 4
3. Shoots terete or subterete; fruit black, epruinose or slightly  
pruinose . . . . . 5. ser. **Acuminatae**

- + Shoots strongly sulcate, rarely subterete; fruit markedly pruinose . . . . . 6. ser. *Sanguineae*
- 4. Ovules 2-4; inner sepals thick, broadly obovate to orbicular, usually strongly concave and reflexed when dry; leaves lanceolate to linear-lanceolate, usually revolute; fruit estylose . . . . . 6. ser. *Sanguineae*
- + Ovules 1-3, rarely 4; inner sepals thinner, oblong to oblanceolate, less concave and not reflexed when dry; leaves plane or, if markedly revolute then pruinose or with pedicels 3-5mm long . . . . . 5
- 5. Bracteoles and outer sepals ovate, obtuse or acute; inner sepals widely oblong; ovules 1-4 . . . . . 6
- + Bracteoles and outer sepals lanceolate to triangular-lanceolate; inner sepals oblanceolate; ovule solitary, rarely 2 . . . . . 9. ser. *Leves*
- 6. Apex of stamens truncate, distinctly produced . . . . . 7. ser. *Wallichianae*
- + Apex of stamens obtuse or rounded, not produced . . . . . 8. ser. *Pruinosae*

4. Series **Baranadanae** (Schneider) Chamberlain & Hu, *stat. nov.*

Syn.: Subsect. *Baranadanae* Schneider in Bull. Herb. Boiss. sér. 2, 5:401 (1905), p.p.

Shoots usually strongly sulcate; leaves distinctly veined; flowers solitary or in fascicles; anthers obtuse or truncate, scarcely produced; ovules (1-) 2-4; fruit black, shortly stylose, rarely estylose, epruinose or slightly pruinose. (Taiwan, Philippines, Indonesia).

Type species: *B. baranadana* Vidal

- 1. Leaves subcoriaceous; ovule solitary . . . . . 20. *hayatana*
- + Leaves coriaceous, sometimes thickly so; ovules 2-4 . . . . . 2
- 2. Flowers solitary, rarely in fascicles of 2-3; leaves 15-25mm long . . . . . 19. *alpicola*
- + Flowers in fascicles of 3-5; leaves 30-100mm long . . . . . 3
- 3. Sepals lanceolate, acuminate; shoots  $\pm$  verruculose . . . . . 18. *kawakamii*
- + Sepals oblong to obovate, rounded at apex; shoots smooth . . . . . 4
- 4. Leaves densely spinose, with 20-40 marginal spines on each side (6-8 per cm) . . . . . 17. *aristo-serrulata*
- + Leaves less densely spinose, with 2-15(-24) spines on each side (2-4 per cm) . . . . . 5
- 5. Shoots strongly sulcate; marginal spines of leaves 1.5-2mm long,  $\pm$  spreading; fruit stylose . . . . . 16. *baranadana*
- + Shoots subterete; marginal spines of leaves c.1mm long,  $\pm$  appressed-spreading; fruit estylose . . . . . 15. *xanthoxylon*

15. **B. xanthoxylon** (Schneider) Schneider in Österr. Bot. Zeitschr. 67:27 (1918).

Syn.: *B. wallichiana* var. *xanthoxylon* Schneider in Bull. Herb. Boiss. sér. 2, 5:402 (1905). Type: Java, *Zollinger* 2325 (iso. BM).

- B. xanthoxylon* Hasskarl, Catal. Pl. Hort. Bogor. Alt. 180 (1844), nom. nud.  
*B. xanthoxylon* var. *junghuhniana* Ahrendt in J. Bot. 79, Suppl.: 26 (1941). Type: Java, *Leeuwen-Reijinvaa*n 1180 (holo. K).  
*B. xanthoxylon* var. *sumatranica* Ahrendt, op. cit. 27 (1941). Type: Sumatra, Korinchi Peak, 10 v 1914, *Robinson & Kloss* s.n. (iso. K).

INDONESIA (Java, Sumatra). On grassy slopes, in thickets, 1000–3100m.

There is considerable variation in the spacing of the marginal spines and there is no fruit on the type specimen of var. *sumatranica*. The varieties described by Ahrendt are not therefore maintained here.

- 16. *B. baranadana*** Vidal, Rev. Pl. Philip. 45 (1885). Type: Philippines, Luzon Distr., Lepanto, *Vidal* 1911 (K).  
PHILIPPINES (Luzon). In primary forest, 2350–2450m.

- 17. *B. aristo-serrulata*** Hayata, Icon. Pl. Formosan. 3:13, f. 5 (1913). Type: Taiwan, Central Mts, iv 1910, *Hayata* s.n. (holo. TO, n.v.).  
Syn.: *B. mingetanensis* Hayata, Icon. Pl. Formosan. 5:4, t.2 (1915). Type: Taiwan, Mt Arisan, Migtsuki, iv 1914, *Hayata* s.n. (holo. TO, n.v.).  
*B. bicolor* auct. non Lévl. (cf. Mizushima in Miss. Rep. Res. Inst. Nat. Res. 35:28, 1954).  
CHINA (Taiwan). In scrub, 2000–3000m.

This species was mistakenly reduced to synonymy under *B. bicolor* Lévl. by Mizushima who was followed by subsequent authors. Although we have not seen the type, some Taiwanese material was available to us and from this it is clear that the two are different species.

- 18. *B. kawakamii*** Hayata in J. Imp. Coll. Sci. Tokyo 30, art. 1:24 (1911). Type: Taiwan, Mt Yushan, 1900, *Kawakami & Mori* s.n. (holo. TO, n.v.).  
Syn.: *B. brevisepala* Hayata, Icon. Pl. Formosan. 3:14 (1913). Type: Taiwan, Mt Alishan, *Mori* s.n. (holo. TO, n.v.).  
*B. nantoensis* Schneider in Repert. Spec. Nov. Regni Veg. 46:252 (1939). Type: Taiwan, Nanto, *Wilson* 10074 (holo. A, n.v.; iso. BM, K).  
*B. formosana* Ahrendt in J. Bot. 79, Suppl.: 24 (1941). Type: Taiwan, Mt Alishan, 25 x 1918, *Wilson* 10910 (holo. K, iso. BM).  
CHINA (Taiwan). Forests and in thickets, 2500–3500m.

- 19. *B. alpicola*** Schneider in Repert. Spec. Nov. Regni Veg. 46:253 (1939). Type: Taiwan, Mt Alishan, *Wilson* 10952 (holo. BM, iso. K).  
CHINA (Taiwan–Alishan). Streamsides, c.3600m.

**20. B. hayata** Mizushima in Miss. Rep. Res. Inst. Nat. Res. 35:31 (1954). Type: Taiwan, Mt Tai-heizan, Rato-gun, *Hayata* s.n. (holo. TO, n.v.). Syn.: *B. formosana* Li in J. Wash. Acad. Sci. 42:41 (1952), non Ahrendt (1941). Type: Taiwan, Nanhutashan, 17 vii 1952, *T. Suzuki* 7258 (holo. TO, n.v.).

CHINA (Taiwan). On mountains.

**5. Series Acuminatae** (Ahrendt) Chamberlain & Hu, *stat. nov.*

Syn.: Subsect. *Acuminatae* Ahrendt in J. Bot. 79, Suppl.: 32 (1941), p.p.

Shoots terete or subterete; leaves usually rather large,  $\pm$  thinly coriaceous, epruinose, reticulate on both surfaces; inner sepals usually thick, broadly obovate or suborbicular, concave and reflexed when dry; anthers obtuse, apiculate or truncate; ovules 2(-3); fruit estylose, epruinose or slightly pruinose.

Type species: *B. acuminata* Franchet

1. Leaves long-acuminate, dull green and densely papillose above; flowers c.6mm diam. . . . . 2  
+ Leaves acute or shortly acuminate,  $\pm$  lustrous and smooth above. . . . . 3
2. Leaves large, usually 9-20cm long, lateral veins 12-15-paired; anthers apiculate . . . . . **21. acuminata**  
+ Leaves smaller, 3.5-10cm long, lateral veins less than 10-paired; anthers rounded at apex . . . . . **22. bicolor**
3. Leaves entire or subentire . . . . . **23. pingshanensis**  
+ Leaves distinctly spinose . . . . . 4
4. Leaves densely spinose, with 30-60 marginal spines on each side (8-10 per cm); flowers 10-15 per fascicle. . . . . **24. arguta**  
+ Leaves less densely spinose, with 10-15 marginal teeth on each side (4-6 per cm); flowers 2-5(-10) per fascicle, 8-12mm diam. . . . . 5
5. Leaves lanceolate to narrowly lanceolate, 8-15mm broad; flowers c.8mm diam. . . . . **25. fallaciosa**  
+ Leaves elliptic to oblong-lanceolate, more than 15mm broad. . . . . 6
6. Leaves 2-4.5cm long, obscurely reticulate . . . . . **26. silvicola**  
+ Leaves 4-14cm long, distinctly reticulate on both surfaces . . . . . 7
7. Leaves oblong to elliptic-lanceolate, epruinose; pedicels 1-2cm long; ovules 2(-4) . . . . . **27. sargentiana**  
+ Leaves elliptic to obovate-elliptic,  $\pm$  pruinose below; pedicels c.0.8cm long; ovules 4-6 . . . . . **28. impedita**

**21. B. acuminata** Franchet in Bull. Soc. Bot. Fr. 33:387 (1886). Type: China, NE Yunnan, Tchen-fong-chan, *Delavay* 494 (iso. E).  
CHINA (NE Yunnan, Guizhou).

**22. B. bicolor** Lévl. in Repert. Spec. Nov. Regni Veg. 9:454 (1911). Type: China, Guizhou, near Guiyang, *Cavalerie* 3043 (holo. E, iso. K).

23. *B. pingshanensis* Sung & Hsiao in Acta Phytotax. Sin. 12:387 (1974). Type: China, Sichuan, Pinshan Xian, *Sichuan Econ. Pl. Exped.* 737 (holo. Herb. Inst. Materia Medica, Sichuan, n.v.).

Known only from the type. We have seen no specimens, but from the original description and figure it seems to be a distinct species allied to *B. sargentiana*.

24. *B. arguta* (Franchet) Schneider in Bull. Herb. Boiss. sér. 2, 8:197 (1908).

Syn.: *B. wallichiana* DC. f. *arguta* Franchet in Bull. Soc. Bot. Fr. 33:388 (1886). Type: China, NE Yunnan, Tchen-fong-chan, *Delavay* 2354 (holo. P).

A distinct species; not found since Delavay's collections.

25. *B. fallaciosa* Schneider in Repert. Spec. Nov. Regni Veg. 46:258 (1939). Type: China, Sichuan, Chungking fu (Chongqing), *Rosthorn* 68 (holo. B, n.v.).

CHINA (E Sichuan, W Hubei). In thickets, 2400–2700m.

26. *B. silvicola* Schneider in Sargent (ed.), Pl. Wilsonianae 3:438 (1917). Type: China, W Hubei, Hsing Shan hsien (Xingshan Xian), in woods, *Wilson* 2879 (iso. E, K).

CHINA (E Sichuan, W Hubei). In scrub, 1200–2400m.

27. *B. sargentiana* Schneider in Sargent (ed.), Pl. Wilsonianae 1:359 (1913). Type: China, W Hubei, Hsing Shan hsien (Xingshan Xian), *Wilson* 564 (iso. E, K).

Syn.: *B. simulans* Schneider in Repert. Spec. Nov. Regni Veg. 46:258 (1939), **syn. nov.** Type: China, Sichuan, Mt Emei, in woods, 1850m, 19 iv 1932, *T. T. Yu* 414 (holo. A).

*B. recurvata* Ahrendt in Gard. Chron. ser. 3, 124:175 (1949), **syn. nov.** Type: China, Fang Xian, in woodlands, *Wilson* 555 (holo. K, iso. E).

CHINA (W Sichuan, W Hubei). In forest, 1800–2100m.

28. *B. impedita* Schneider in Repert. Spec. Nov. Regni Veg. 46:263 (1939). Type: China, Guangxi, N Luchen, 17 vii 1929, *R. C. Ching* 6053 (holo. W, iso. IBSC).

CHINA (N Guangxi, W Hunan, N Guangdong). In forest on rocky shaded slopes, 1300–2100m.

Examination of a specimen collected from Lin-Gui Xian in NE Guangxi (*Z. Z. Chen* 50818) allows us to supplement the original description as follows.

Ramuli annotini sulcato-striati, glabri, flavescentes. Flores (1–)2–4 fasciculati, flavi. Pediceli 8–15mm longi. Bracteolae ovatae, 2.5mm longae, acutae. Sepala exteriora elliptico-oblonga, 3.5–4.5 × 1.8–2.5mm, interiora elliptica, 5–5.5 × 3–3.5mm, apice rotundata. Petala obovata, c.4 × 2.5mm, apice emarginata. Stamina c.3mm longa; antherae oblongae, connectiva apice paulo dilatato et bidenticulata. Ovarium cylindricum, ovulis 4–6.

**6. Series *Sanguineae* (Schneider) Chamberlain & Hu, stat. nov.**

Syn.: Subsect. *Sanguineae* Schneider in Bull. Herb. Boiss. sér. 2, 5:403 (1905), p.p.

Shoots sulcate or angled; leaves usually lanceolate to linear-lanceolate, rarely oblong-ovate, sometimes strongly revolute, epruinose; flowers in fascicles, rarely solitary; inner sepals thick, broadly obovate to orbicular, usually strongly concave and reflexed when dry; ovules 2-4; fruit estylose, pruinose.

Type species: *B. sanguinea* Franchet

- |  |                         |
|--|-------------------------|
| 1. Leaves ovate to lanceolate, plane, reticulate on both surfaces                      | 2                       |
| + Leaves narrowly lanceolate to linear-lanceolate, usually strongly revolute, enervate | 8                       |
| 2. Upper surface of leaves dull, densely papillate                                     | 3                       |
| + Upper surface of leaves $\pm$ lustrous and glabrous                                  | 7                       |
| 3. Pedicels 3-4mm; leaves lanceolate   | <b>35. paraspecta</b>   |
| + Pedicels more than 5mm   | 4                       |
| 4. Leaves elliptic to ovate-elliptic, 1.5-2 $\times$ as long as broad                  | <b>34. petrogena</b>    |
| + Leaves lanceolate to ovate-lanceolate 3-5 $\times$ as long as broad                  | 5                       |
| 5. Shoots slightly angled or subterete; fascicles 4-10-flowered; pedicels 7-20mm       | <b>31. delavayi</b>     |
| + Shoots strongly sulcate; fascicles 1-6-flowered; pedicels 8-22mm                     | 6                       |
| 6. Fascicles 2-6-flowered; pedicels 18-22mm; leaves 4.5-9cm long                       | <b>33. subacuminata</b> |
| + Fascicles 1-4-flowered; pedicels 8-12mm; leaves usually less than 4.5cm long         | <b>32. davidii</b>      |
| 7. Leaves ovate to ovate-lanceolate, 15-23mm broad                                     | <b>29. buchananii</b>   |
| + Leaves lanceolate to oblong-lanceolate, 8-15mm broad                                 | <b>30. fallax</b>       |
| 8. Leaves very narrow, 10-20 $\times$ as long as broad                                 | <b>37. insolita</b>     |
| + Leaves broader, 5-7(-10) $\times$ as long as broad                                   | 9                       |
| 9. Leaves lustrous; shoots distinctly verruculose; ovules 4                            | <b>38. lubrica</b>      |
| + Leaves dull; shoots scarcely verruculose; ovules 2-3                                 | <b>36. sanguinea</b>    |

**29. *B. buchananii*** Schneider in Repert. Spec. Nov. Regni Veg. 46:263 (1939). Type: Upper Burma, Ruby Mine district, *Buchanan* 165 (K).

Known only from the type; superficially resembling *B. manipurana* of ser. *Wallichianae* but distinguished by its yellow shoots and obtuse, not produced, anthers.

**30. *B. fallax*** Schneider in Repert. Spec. Nov. Regni Veg. 46:260 (1939), p.p. Type: China, W Yunnan Che-tze-lo (Bijiang Xian), 3200m, in forest, *H. T. Tsai* 58521 (holo. A, iso. IBSC).

CHINA (W Yunnan). In forest, 3000-3500m.

**31. *B. delavayi*** Schneider in Sargent (ed.), Pl. Wilsonianae 1:364 (1913).

Type: China, Yunnan, Eryuan Xian, Huong-li-pin, 21 iii 1887, *Delavay* s.n. (holo. P).

CHINA (W Yunnan).

This species closely resembles the larger leaved forms of *B. davidii* but may be distinguished by the subterete shoots and larger number of flowers per fascicle.

**32. *B. davidii*** Ahrendt in J. Linn. Soc., Bot. 57:56 (1961). Type: as for *B. wallichiana* f. *parvifolia* Franchet.

Syn.: *B. wallichiana* DC. f. *parvifolia* Franchet, Pl. Delav. 38 (1889).

Type: China, Yunnan, Mt Tsangshan (Cangshan), *Delavay* 1124 (holo. P).

*B. densa* Schneider in Repert. Spec. Nov. Regni Veg. 46:254 (1939), non Triana & Planchon (1862).

*B. fallax* Schneider, op. cit.: 260 (1939), p.p., excl. typ.

CHINA (NE Yunnan). In forest glades and along stream banks, 2000–2700m.

Although the leaves are usually small ( $10-25 \times 6-8$ mm), they can be up to  $50 \times 15$ mm. The larger leaved forms differ from *B. delavayi* only in the characters mentioned under that species.

**33. *B. subacuminata*** Schneider in Sargent (ed.), Pl. Wilsonianae 1:363 (1913). Type: China, W Yunnan, Yuan Chiang (Yuan Jiang), *Henry* 13267 (iso. K, E).

CHINA (SW Yunnan). Amongst scrub on dry slopes, 2300–2700m.

**34. *B. petrogena*** Schneider in Repert. Spec. Nov. Regni Veg. 46:253 (1939). Type: China, W Yunnan, N'Maikha-Salwin Divide, *Forrest* 18195 (holo. E, iso. K).

On rocky slopes and in thickets; known only from the type collection.

**35. *B. paraspecta*** Ahrendt in J. Linn. Soc., Bot. 57:47 (1961). Type: China, NW Yunnan, Lijiang, *Schneider* 2028 (holo. K).

CHINA (NW Yunnan). In forest, c.2700m.

The original description of *B. paraspecta* was wrong in describing the pedicels as 3–4cm long; they are in fact 3–4mm long.

**36. *B. sanguinea*** Franchet in Nuov. Arch. Mus. Paris sér. 2, 8:194, t.5 (1886). Type: China, W Sichuan, Mupin (Baoxing), iv 1869, *David* s.n. (holo. P).

Syn.: *B. panlanensis* Ahrendt in Kew Bull. 1939:265 (1939), **syn. nov.**

Type: China, W Sichuan, Pan-lan-shan, 2900m, *Wilson* 2875, n.v.

CHINA (W Sichuan). Alt. 2000–3000m.

*B. panlanensis* is an obscure species. The type (*Wilson* 2875) is cited as being at Kew but we have been unable to locate it there. Ahrendt based his description mainly on cultivated material so it is possible that the type is a cultivated specimen. In any case it seems to us that the diagnostic

characters given are scarcely striking enough for its recognition as a separate species.

**37. *B. insolita*** Schneider in Repert. Spec. Nov. Regni Veg. 46:257 (1939). Type: China, Sichuan, Liangshan (Daliang shan), Ning Yuan fu, 25 iv 1914, *Schneider* 1029 (iso. K).  
CHINA (SW Sichuan). In forest, 2500m.

The type specimen lacks flowers and fruit, but its very long and narrow leaves are characteristic. Further material is required to check whether or not this feature is due to an environmental modification.

**38. *B. lubrica*** Schneider in Repert. Spec. Nov. Regni Veg. 46:265 (1939). Type: China, SW Sichuan, near Huili, 2800m, 25 v 1914, *Schneider* 1384 (iso. K, E).  
Known only from the type collection.

**7. Series *Wallichianae* (Schneider) Chamberlain & Hu, stat. nov.**

Syn.: Subject. *Wallichianae* Schneider in Bull. Herb. Boiss. sér. 2, 5:402 (1905), p.max.p.

Subject. *Triacanthophorae* Schneider in Mitt. Deutsch. Dendr. Ges. 55:33 (1942), p.max.p.

Subser. *Replicantae* Ahrendt in J. Linn. Soc., Bot. 57:41 (1961), p.p.

Subser. *Soulieanae* Ahrendt in J. Bot. 79, Suppl.: 23 (1941), p.p.

Shoots terete or sulcate; leaves pruinose or epruinose; flowers in fascicles; inner sepals and petals thin, usually oblong to oblong-lanceolate, only slightly concave and not reflexed when dry; apex of stamens distinctly produced, truncate; ovules 1-3(-4); fruit shortly stylose,  $\pm$  pruinose.

Type species: *B. wallichiana* DC.

- |  |                        |
|--|------------------------|
| 1. Petals shorter than outer sepals . . . . .  | 2                      |
| + Petals longer than outer sepals . . . . .  | 3                      |
| 2. Pedicels 3-4mm; leaves with 1-4 marginal spinules on each side . . . . .  | <b>58. micropetala</b> |
| + Pedicels 8-12mm; leaves with 8-15 marginal spinules on each side . . . . .                                       | <b>59. xanthoclada</b> |
| 3. Shoots yellow . . . . .   | 4                      |
| + Shoots purple . . . . .  | 18                     |
| 4. Petals deeply incised . . . . .   | 5                      |
| + Petals entire or emarginate . . . . .  | 8                      |
| 5. Leaves oblanceolate to elliptic-oblanceolate, with only 1-4 small teeth on each side above the middle . . . . . | <b>45. chingii</b>     |
| + Leaves elliptic to narrowly oblong-lanceolate, with 6-10(-14) marginal spines on each side . . . . .             | 6                      |
| 6. Leaves thinly coriaceous, flexible, usually dull green above; fruit oblong-ellipsoid; style c.1mm . . . . .     | <b>44. lempergiana</b> |



- + Leaves thick, coriaceous, rigid,  $\pm$  lustrous above; fruit ovoid; style c.0.5mm . . . . . 7
- 7. Flowers 10–13mm diam; pedicels 5–10mm; leaves with lateral veins almost at  $90^\circ$  to midrib . . . . . **42. soulieana**
- + Flowers 6–7mm diam.; pedicels 10–20mm; leaves with lateral veins at an acute angle . . . . . **43. bergmanniae**
- 8. Leaves  $\pm$  pruinose below . . . . . 9
- + Leaves epruinose . . . . . 14
- 9. Leaves distinctly white below, enervate, strongly revolute . . . . . 10
- + Leaves glaucous below, not strongly revolute, with lateral veins visible or reticulate . . . . . 12
- 10. Shoots slender, terete; leaves dull green above . . . . . **46. replicata**
- + Shoots stout; leaves lustrous above . . . . . 11
- 11. Shoots sulcate; leaves finely spinose-serrulate . . . . . **47. taliensis**
- + Shoots terete; leaves coarsely spinose-serrulate . . . . . **48. amabilis**
- 12. Shoots  $\pm$  angled; leaves with  $\pm$  reticulate veins; ovules 2–4 . . . . . **49. griffithiana**
- + Shoots terete; leaves enervate; ovules 2. . . . . 13
- 13. Pedicels 20–30mm long; leaves with 4–9 pairs of marginal spines, spines 1–2mm long . . . . . **51. taronensis**
- + Pedicels 8–13mm long; leaves with 1–5 pairs of spines, spines 0.5mm long . . . . . **52. holocraspedon**
- 14. Leaves oblong-elliptic to oblong-ovate, distinctly reticulate . . . . . 15
- + Leaves  $\pm$  lanceolate, enervate or obscurely veined . . . . . 16
- 15. Spines very stout, sulcate; ovule solitary . . . . . **53. deinacantha**
- + Spines not stout; ovules 3 . . . . . **54. manipurana**
- 16. Leaves oblong-lanceolate, more than 1.5cm broad; pedicels stout, 6–10mm long; ovule solitary . . . . . **55. wallichiana**
- + Leaves lanceolate to narrowly elliptic-lanceolate, less than 1.2cm broad; pedicels slender, 10–25mm long, ovules 1–4 . . . . . 17
- 17. Flowers 12–13mm diam., 3–7 per fascicle; pedicels 20–23mm long; ovules 2–4; leaves dull green above . . . . . **49. griffithiana**
- + Flowers 8–10mm diam., usually 5–15 per fascicle; pedicels 7–17mm long; ovules 1–2; leaves  $\pm$  lustrous . . . . . **50. praecipua**
- 18. Leaves entire . . . . . **56. collettii**
- + Leaves spinous-dentate . . . . . 18
- 19. Spines very stout, sulcate; ovule solitary . . . . . **53. deinacantha**
- + Spines not stout, terete; ovules 2–4 . . . . . 20
- 20. Shoots sulcate; leaves elliptic to oblong-obovate; ovules 3–4 **57. wardii**
- + Shoots terete; leaves lanceolate; ovules 2–4 . . . . . 21
- 21. Leaves with 10–30 pairs of marginal spines, dull above **39. veitchii**
- + Leaves with 2–6(–10) pairs of marginal spines,  $\pm$  lustrous above. 22

22. Leaves oblong-lanceolate; ovules 3-4 . . . . . **41. venusta**  
 + Leaves linear-lanceolate; ovules usually 2 . . . . . **40. triacanthophora**

**39. B. veitchii** Schneider in Sargent (ed.), Pl. Wilsonianae 1:363 (1913). Type: China, W Hubei, Kuitschou (Ziqui), *Wilson* 1138 (iso. K).

CHINA (W Hubei, N Guizhou). In scrub, along streams, in woods, 2000-3000m.

**40. B. triacanthophora** Fedde in Bot. Jahrb. 36 (Beibl. 82):43 (1905). Type: China, W Hubei, Changyang, *Henry* 5861 (iso. E, K).

CHINA (E Sichuan, W Hubei, S Shaanxi). In mixed forest, 500-2000m.

**41. B. venusta** Schneider in Repert. Spec. Nov. Regni Veg. 46:256 (1939). Type: N Burma, above Nyitadi, below Mo-Ko-Ji Pass, 26 v 1920, *Farrer* 1579 (holo. E).

Known only from the type collection. Superficially resembling *B. triacanthophora* but distinguished by its broader leaves and in having 3-4 ovules.

**42. B. soulieana** Schneider in Bull. Herb. Boiss. sér. 2, 5:449 (1905), nom. nov. for *B. stenophylla* Hance.

Syn.: *B. stenophylla* Hance in J. Linn. Soc., Bot. 22:257 (1887), non Lindley (1864). Type: China, Sichuan, Chungking (Chongqing), 1881, *Parker* s.n. (holo. BM).

*B. soulieana* Schneider var. *paucinervata* Ahrendt in J. Linn. Soc., Bot. 57:78 (1961). Type: China, S Shaanxi, *Licent* 2588 (holo. K).

CHINA (E Sichuan, S Shaanxi). Forest margins, streamsides, 600-2000m.

The prominent lateral veins on the upper surface of the leaves, used by Ahrendt to characterize var. *paucinervata*, is considered to be too trivial a character to recognize even a variety.

**43. B. bergmanniae** Schneider in Sargent (ed.), Pl. Wilsonianae 1:362 (1913).

1. Leaves with 6-12 marginal spines . . . . . **43a. var. bergmanniae**  
 + Leaves with 4-5 coarse marginal spines . . . . . **43b. var. acanthophylla**

**43a. var. bergmanniae.** Type: China, W Sichuan, Han-yuan Hsien (Ching-chi Hsien), *Wilson* 2876 (holo.? A, n.v.).

CHINA (W Sichuan). Mountain sides, in thickets, 1600-2000m.

**43b. var. acanthophylla** Schneider, op. cit.: 362 (1913). Type: W. Sichuan, Wen Chuan Hsien, *Wilson* 4149 (holo.? A, n.v.).

CHINA (W Sichuan). Mountain sides, in thickets, 2000-2500m.

Although we have not been able to trace Wilson's types, recent gatherings from W Sichuan (*Soong*, Z. P. 38148, 39323 & 39431) match the original description well. Allied to *B. soulieana* but differing as indicated in the key.

**44. *B. lempergiana*** Ahrendt in Gard. Chron. 3, 109:101 (1941). Type: a plant raised by Hillier from seed sent from Nanjing Botanic Garden; flowered 9 v 1941 (holo. OXF, n.v.).  
CHINA (Zhejiang). In forest and scrub, c.1200m.

**45. *B. chingii*** Cheng in Contr. Biol. Lab. Sci. Soc. China Bot. ser. 3, 9:191, f. 17 (1942). Type: China, Jiangxi, Wutuan Xian, *R. C. Ching* 3248 (holo. PE, n.v.; iso. K, E).

Known only from the type collection. Closely allied to *B. lempergiana* but differing in its white-pruinose leaves.

**46. *B. replicata*** W. W. Smith in Notes RBG Edinb. 11:200 (1920). Type: China, Yunnan, N of Tengyueh (Tengchong), *Forrest* 9545 (holo. E, iso. K).

CHINA (SW Yunnan, around Tengchong). Open situations, amongst scrub on hills, 1500–2400m.

**47. *B. taliensis*** Schneider in Repert. Spec. Nov. Regni Veg. 46:252 (1939). Type: China, Yunnan, E flank of the Dali Range, 3000m, *Forrest* 19417 (holo. E, iso. K).

CHINA (W Yunnan, around Dali). On bouldery scrub-clad slopes in side valleys, 3000–4000m.

**48. *B. amabilis*** Schneider in Repert. Spec. Nov. Regni Veg. 46:257 (1939). Type: N Burma, Adung Valley, 27 iii 1931, *Kingdon-Ward* 9324 (holo. A, iso. BM).

Syn.: *B. bhutanensis* sensu Ahrendt, p.p.

NE UPPER BURMA. Forest margins, 1800–2400m.

**49. *B. griffithiana*** Schneider in Bull. Herb. Boiss. sér. 2, 5:403 (1905).

1. Leaves green, epruinose below . . . . . **49a. var. *griffithiana***  
+ Leaves glaucous, ± pruinose below . . . . . **49b. var. *pallida***

**49a. var. *griffithiana***. Syntypes: Bhutan, *Griffith* 125 (W, n.v.); Bhutan, *Griffith* 1742 (E, K).

Syn.: *B. subpteroclada* Ahrendt in J. Bot. 79, Suppl.: 21 (1941), **syn. nov.**  
Type: Bhutan, Chendebe, 2800m, 14 v 1937, *Ludlow & Sherriff* 3046 (holo. BM).

*B. subpteroclada* var. *impar* Ahrendt, loc. cit. (1941), **syn. nov.** Type: Bhutan, Chendebe, 2800m, 14 v 1937, *Ludlow & Sherriff* 3045 (holo. BM).

BHUTAN, CHINA (S Xizang). In *Tsuga*, *Rhododendron* and bamboo forest, 2500–3300m.

**49b. var. *pallida*** (Hook. f. & Thomson) Chamberlain & Hu, **comb. nov.**

Syn.: *B. wallichiana* DC. var. *pallida* Hook. f. & Thomson, Fl. Ind. 1:226 (1855). Type: Bhutan, *Griffith* 1741 (holo. K, iso. E).

*B. bhutanensis* Ahrendt in J. Bot. 79, Suppl.: 17 (1941), **syn. nov.**  
Type: Bhutan, *Griffith* 1741 (holo. K, iso. W).

*B. leptopoda* Ahrendt, op. cit.: 33 (1941), **syn. nov.** Type: China, SE Xizang, Pachahshiri Distr., Lhalung, 2100m, *Ludlow, Sherriff & Taylor* 3697 (holo. BM).

*B. replicata* W. W. Sm. var. *dispar* Ahrendt, op. cit.: 20 (1941), **syn. nov.** Type: China, SE Xizang, Nyam Jang Chu, 4 iv 1936, *Ludlow & Sherriff* 1274 (holo. BM).

*B. taronensis* Ahrendt var. *trimensis* Ahrendt in J. Linn. Soc. Bot. 57:79 (1961), **syn. nov.** Type: SE Xiaang, Takpo, Trimo, Nyam Jang Chu, 3500m, *Ludlow, Sherriff & Elliot* 12518 (holo. BM).

E BHUTAN, CHINA (S Xizang). In open scrub, forest clearings and along river banks, 2100–3500m.

**50. *B. praecipua*** Schneider in Repert. Spec. Nov. Regni Veg. 46:248 (1939). Type: Bhutan, Phajudin, Timpu, 13 viii 1914, *Cooper* 2524 (holo. E).

Syn.: *B. subpteroclada* Ahrendt var. *minoripes* Ahrendt in J. Linn. Soc., Bot. 57:73 (1961), **syn. nov.** Type: Bhutan, Ha Dzong, 2700m, *Ludlow, Sherriff & Hicks* 16015 (holo. BM, iso. E).

*B. poluninii* Ahrendt, loc. cit. (1961), **syn. nov.** Type: C Nepal, Compaling, 3 miles E of Timure, 3200m, *Polunin* 746 (holo. BM).

C & E NEPAL, BHUTAN, Dry slopes in pine forest, 2100–3300m.

Often confused with *B. griffithiana* but with the differences in the number of ovules and in the leaves are well marked and are correlated with the distributions of the two species. The Chinese specimens cited by Schneider (n.v.) are probably not this species.

**51. *B. taronensis*** Ahrendt in J. Bot. 79, Suppl.: 23 (1941). Type: China, SE Xizang, Zayul, Taron Valley, Chilung, 2500m, *T. T. Yu* 19658 (holo. E).

CHINA (SE Xizang). Margins of mixed forest, 2100–2600m.

This species closely resembles *B. amabilis* but differs in the less strongly revolute leaves with more marked lateral veins, its longer pedicels and pruinose fruits.

**52. *B. holocraspedon*** Ahrendt in J. Bot. 79, Suppl.: 22 (1941). Type: China, Yunnan, Shunning (Fengqing), 2900m, *T. T. Yu* 18228 (holo. E). CHINA (NW Yunnan). In thickets, 2500–3000m.

**53. *B. deinacantha*** Schneider in Repert. Spec. Nov. Regni Veg. 46:259 (1939).

1. Shoots purplish . . . . .	<b>53a. var. <i>deinacantha</i></b>
+ Shoots yellow . . . . .	<b>53b. var. <i>valida</i></b>

**53a. var. *deinacantha***. Type: China, W Yunnan, Chienchuan/Mekong divide, *Forrest* 23556 (holo. E, iso. K). CHINA (NW Yunnan). In thickets on rocky slopes, 2700–3000m.

**53b. var. *valida*** Schneider in Repert. Spec. Nov. Regni Veg. 46:260 (1939). Type: China, SW Sichuan, Ning Yuen fu, Xichang Distr.,

*Schneider* 918 (holo. Herb. Dendr. Schneider, n.v.).

Syn.: *B. valida* (Schneider) Schneider in Mitt. Deutsch. Dendr. Ges. 55:40 (1942).

Known only from a few collections and differing from var. *deinacantha* only in the colour of the shoots, a character that is variable in other species of *Berberis*.

**54. *B. manipurana*** Ahrendt in Kew Bull. 1939:262 (1939). Type: India, Manipur, Ching Sow, NE ranges, 2400m, *Watt* 6533 (holo. K, iso. E). NE INDIA (Manipur, Assam). Forest margins and in scrub, 1500–2400m.

**55. *B. wallichiana*** DC., Prodr. 1:107 (1824). Type: Nepal, Mt Sheopur, *Wallich* 1478 (iso. K). C NEPAL. On ridges, in rhododendron and oak scrub, 2400–3300m.

While the fruit is usually epruinose, some specimens from the type locality have pruinose berries.

**56. *B. collettii*** Schneider in Österr. Bot. Zeitschr. 67:140 (1918). Type: N Burma, Shan Hills, 1200m, *Collett* 787 (holo. K).

Known only from the type and characterized by its entire leaves.

**57. *B. wardii*** Schneider in Repert. Spec. Nov. Regni Veg. 46:262 (1939). Type: NE India, Japvo, Naga Hills, 2 xii 1927, *Kingdon-Ward* 7729 (holo. K). NE INDIA (Nagaland). Open grassy places, amongst *Ilex* and *Rubus*, 3000m.

**58. *B. micropetala*** Schneider, Repert. Spec. Nov. Regni Veg. 46:266 (1939). Type: NE India, Naga Hills, Saramati Ridge, 2800m, *Bor* 2921 (holo. K). NE INDIA (Nagaland). Open grassy ridge, c.3000m.

**59. *B. xanthoclada*** Schneider in Repert. Spec. Nov. Regni Veg. 46:261 (1939). Type: China, Guizhou, Fangin Shan, 30 ix 1930, *Steward, Chiao & Cheou* 482 (holo. A; iso. E, K). CHINA (E Guizhou). In scrub, 1800–2100m.

Flowers of this little known species are now available from a specimen collected on Lei shan (*Gao*, Z. Y. 911); a fuller description of this species is now provided.

Ramuli annotini, striato-sulcati, fusco-flavi, vetustiores cinerascetes. Flores 12–15mm diam., flavae, 2–5 fasciculatae. Pedicelli 8–13mm longi. Bracteolae lanceolatae,  $c.4 \times 1.5$ mm. Sepala exteriora anguste elliptico-oblonga,  $5.5-6 \times 2-2.5$ mm, interiora elliptico-oblonga,  $6-6.8 \times 2.5-3$ mm, apice rotundata. Petala obovata,  $c.4 \times 2.2$ mm, apice emarginata. Stamina  $c.2.5$ mm longa antheris apice truncata. Ovarium cylindricum ovulis 5, breviter stipitatis instructum.

Although superficially resembling *B. impedita* of ser. *Acuminatae*, on the basis of its flower structure, this species seems closer to *B. micropetala*.

8. Series **Pruinosae** (Schneider) Chamberlain & Hu, *stat. nov.*

Syn.: Subsect. *Pruinosae* Schneider in Bull. Herb. Boiss. sér. 2, 5:398 (1905).

Shoots yellow, terete or sulcate; leaves pruinose or epruinose; flowers in fascicles, rarely also in 2-3-flowered racemes; bracteoles and outer sepals ovate, obtuse or acute; inner sepals and petals thin, oblong to oblanceolate, less concave and not reflexed when dry; apex of stamens obtuse, not produced; ovules 1-3(-6); fruit shortly stylose, pruinose.

Type species: *B. pruinosa* Franchet.

- |  |                       |
|--|-----------------------|
| 1. Shoots sulcate; ovules solitary . . . . .   | <b>60. liophylla</b>  |
| + Shoots terete; ovules (1-)2-3(-6) . . . . .  | 2                     |
| 2. Flowers in fascicles often mixed with 2-3-flowered racemes;<br>ovules 4-6 . . . . . | <b>61. centiflora</b> |
| + Flowers only in fascicles; ovules 2-3 . . . . .                                      | 3                     |
| 3. Leaves $\pm$ pruinose, usually with only 1-6 coarse marginal<br>spines . . . . .    | <b>62. pruinosa</b>   |
| + Leaves epruinose, with more than 10 marginal spines . . . . .                        | 4                     |
| 4. Pedicels 20-30mm long, green; ovules 2-3 . . . . .                                  | <b>63. mairei</b>     |
| + Pedicels 6-18(-20)mm long, reddish; ovules 1-2 . . . . .                             | <b>64. dumicola</b>   |

**60. *B. liophylla*** Schneider in Repert. Spec. Nov. Regni Veg. 46:247 (1939). Type: China, W Sichuan, zwischen See-guei (Sik wai) und Tschaukio (Tjiadjio), 22·iv 1914, *Schneider* 969 (holo. Herb. Dendr. Schneider, n.v., iso. A).

CHINA (SW Sichuan, NE Yunnan). Forest margins, thickets, 2100-2200m.

A little-known species intermediate between *B. pruinosa* and *B. wangii*; possibly a variant of the former species.

**61. *B. centiflora*** Diels in Notes RBG Edinb. 5:176 (1912). Type: China, W Yunnan, E flank of the Dali Range, 2700-3300m, *Forrest* 4689 (holo. E).

Syn.: *B. pruinosa* Franchet var. *centiflora* (Diels) Hand.-Mazz., Symb. Sin. 7:325 (1931), quoad typum tantum.

A distinct species, known only from the type collection. In the original description Diels does not mention the number of ovules. Ahrendt (1961) appears to be mistaken in suggesting that it had 2-3 ovules, as the type specimen at Edinburgh clearly has 4-6.

**62. *B. pruinosa*** Franchet in Bull. Soc. Bot. Fr. 33:387 (1886). Type: China, Yunnan, Mo-so-yin (Eryuan Xian), *Delavay* 493 (holo. P).

Syn.: *B. hibbardiana* Ahrendt in J. Linn. Soc., Bot. 57:79, (1961), *syn. nov.*

Type: China, Yunnan, *McLaren* C 103 (holo. K, iso. E).

*B. pruinosa* var. *brevipes* Ahrendt in J. Bot. 79, Suppl.: 15 (1941).

Type: China, NW Yunnan, Atuntze (Deqen), 2500-2800m, *T. T. Yu* 15662 (holo. E).

*B. pruinosa* var. *viridifolia* Schneider in Repert. Spec. Nov. Regni Veg. 46:250 (1939), p.p. No type designated.

*B. pruinosa* var. *tenuipes* Ahrendt in J. Linn. Soc., Bot. 57:81 (1961).

Type: China, Yunnan, N of Kunming, *Schneider* 342 (holo. K).

CHINA (Yunnan). In thickets, 2500–3000m.

A very variable species, showing variability in leaf shape, size, number of marginal spines, the degree of pruinosity on the lower surface of the leaves, and the length of the pedicels. Sometimes even the leaves on young shoots and old branches of the same plant are very different. The varieties described by Ahrendt are probably selected variants in cultivation or even hybrids.

**63. *B. mairei*** Ahrendt in J. Linn. Soc., Bot. 57:76 (1961). Type: China, Yunnan, *Maire* 1999 (holo. K, iso. E).

An obscure species known only from the type collection, which was determined by Schneider as *B. bergmanniae* var. *acanthophylla* forma. Apart from the greater number of marginal spines on the leaves, it is close to *B. pruinosa* var. *tenuipes*, a taxon that we treat as a variant of *B. pruinosa*.

**64. *B. dunicola*** Schneider in Repert. Spec. Nov. Regni Veg. 46:249 (1939). Type: China, NW Yunnan, Mekong/Salween Divide, 3000m, *Forrest* 13295 (holo. E).

CHINA (NW Yunnan). Open rocky slopes, forest margins and in thickets, 3000–4000m.

**9. Series *Leves* (Ahrendt) Chamberlain & Hu, stat. nov.**

Syn.: Subsection *Leves* Ahrendt in J. Bot. 79, Suppl.: 18 (1941), p.p.

Shoots terete or sulcate; leaves pruinose or epruinose; flowers in fascicles; bracteoles and outer sepals lanceolate to triangular-lanceolate, keeled, much smaller than inner sepals and petals; inner sepals oblanceolate, not darkening when dry; apex of stamens truncate or obtuse; ovule solitary, rarely 2; fruit stylose, pruinose or epruinose.

Type species: *B. levis* Franchet.

- |  |                               |
|--|-------------------------------|
| 1. Leaves narrowly lanceolate to linear-lanceolate, strongly revolute;<br>pedicels 1–4mm long . . . . .              | <b>65. <i>grodtmannia</i></b> |
| + Leaves broader, not revolute; pedicels over 4mm long . . . . .   | 2                             |
| 2. Shoots terete . . . . .   | 3                             |
| + Shoots sulcate . . . . .   | 4                             |
| 3. Shoots distinctly verruculose; leaves epruinose . . . . .   | <b>66. <i>levis</i></b>       |
| + Shoots glabrous; leaves $\pm$ pruinose below . . . . .   | <b>67. <i>wangii</i></b>      |
| 4. Fruit pruinose . . . . .  | 5                             |
| + Fruit epruinose . . . . .  | 7                             |
| 5. Leaves conspicuously revolute, with serrations obscured when<br>viewed from above, white-pruinose below . . . . . | <b>68. <i>nemorosa</i></b>    |

- + Leaves plane or subrevolute, serrations visible from above, epruinose below . . . . . 6
- 6. Leaves densely papillose on upper surface, dull; petals narrow, less than 2mm broad . . . . . 69. *cavaleriei*
- + Leaves  $\pm$  lustrous and smooth above; petals more than 2mm broad . . . . . 70. *julianae*
- 7. Leaves thinly coriaceous, flexible; petals deeply incised; ovules usually 2 . . . . . 74. *atrocarpa*
- + Leaves thickly coriaceous,  $\pm$  rigid; petals entire or emarginate; ovule usually solitary . . . . . 8
- 8. Leaves densely spinose (6–8 spines per cm) . . . . . 71. *ferdinandi-coburgii*
- + Leaves less densely spinose (4–5 spines per cm) . . . . . 9
- 9. Shoots angled; leaves  $\pm$  lustrous and reticulate above . . . . . 73. *victoriana*
- + Shoots strongly sulcate; leaves dull and enervate above . . . . . 72. *vernalis*

**65. *B. grodtmannia*** Schneider in Österr. Bot. Zeitschr. 67:32 (1918).

- 1. Shoots purplish . . . . . 65a. var. *grodtmannia*
- + Shoots yellow . . . . . 65b. var. *flavaramaea*

**65a. var. *grodtmannia*.** Type: China, SW Sichuan, Yan-Yun Xian, c.3500m, *Schneider* 1268 (holo. K, iso. E).

Known only from the type collection. A very distinct species easily recognized by its short pedicels and its narrow, strongly revolute leaves.

**65b. var. *flavaramaea*** Schneider in Repert. Spec. Nov. Regni Veg. 46:256 (1939). Type: China, Yunnan, Yungning (Ninglang Xian), 22 iv 1922, *Kingdon-Ward* 5078 (holo. E).

CHINA (NW Yunnan, SW Sichuan). In woodland, 3300–3500m.

**66. *B. levis*** Franchet in Bull. Soc. Bot. Fr. 33:386 (1886). Type: China: W Yunnan, above Tapintze (Beqing Xian), *Delavay* 495 (holo. P, iso. E).

Syn.: *B. levis* var. *brachyphylla* Ahrendt in J. Linn. Soc., Bot. 57:75 (1961). Type: China, NW Yunnan, Sungkwei Pass, from the Langkong Valley, 2700–3000m, *Forrest* 2012 (holo. K, iso. E).

*B. willeana* Schneider in Österr. Bot. Zeitschr. 67:141 (1918), **syn. nov.** Type: China, NW Yunnan, between Tai-mao-ko and Lijiang, *Schneider* 1763 (iso. E, K).

*B. willeana* var. *serrulata* Schneider in Repert. Spec. Nov. Regni Veg. 46:245 (1939), **syn. nov.** Type: China, W Yunnan, Pin-chuan (Binchuan Xian), *H. T. Tsai* 53000 (holo. A, n.v.).

CHINA (NW Yunnan). On stony slopes amongst scrub, 2700–3500m.

Schneider differentiated *B. willeana* from the other taxa cited above mainly on its verruculose shoots, which is in fact a character typical of *B. levis*. Some specimens have coarser teeth than normal but this difference seems scarcely sufficient to warrant varietal status.



67. **B. wangii** Schneider in Repert. Spec. Nov. Regni Veg. 46:246 (1939). Type: China, Yunnan, near Kunming, *C. W. Wang* 62639 (holo. A). Syn.: *B. pruinosa* Franchet var. *viridifolia* Schneider, op. cit.: 250 (1939), p.p.

*B. schneideriana* Ahrendt in J. Linn. Soc., Bot. 57:76 (1961), **syn. nov.** Type: China, Yunnan Kunming, *Schneider* 164 (holo. K).

CHINA (E Yunnan). Open woods, dry slopes, c.2000m.

There is a superficial resemblance between this species and *B. vernalis* but it can be easily distinguished by its terete shoots, pruinose leaves and fruit. *B. wangii* differs from *B. pruinosa* chiefly in the shape of the bracteoles and inner sepals, and in the number and density of the marginal spines on the leaves.

68. **B. nemorosa** Schneider in Repert. Spec. Nov. Regni Veg. 46:246 (1939). Type: China, Guangxi, Dar-Sir Ping, Min shan, N Luchen, 20 vi 1928, *R. C. Ching* 6192 (holo. NY, n.v., iso. NAS).

CHINA (NW Guangxi). In open thickets. 1300m.

Known only from the type material. This species resembles *B. vernalis* but differs in the leaf undersurfaces and fruit which are white-pruinose.

69. **B. cavaleriei** Lévl. in Repert. Spec. Nov. Regni Veg. 9:454 (1911). Type: China, Guizhou, near Guiyang, *Cavalerie* 3209 (holo. E, iso. K).

Syn.: *B. emelii* Schneider in Repert. Spec. Nov. Regni Veg. 46: 255 (1939), **syn. nov.** Type: China, Guizhou, near Guiyang, *Bodinier* 2145 (holo. E, iso. P).

*B. dolichostemon* Ahrendt in J. Linn. Soc., Bot. 57:59 (1961), **syn. nov.** Type: China, Yunnan, sen, *Cavalerie* 7852 (holo. K, iso. E).

*B. praecipua* Schneider var. *major* Ahrendt, op. cit.: 43 (1961), **syn. nov.** Type: China, Yunnan, *Maire* 1998 (holo. K, iso. E).

*B. liophylla* Schneider var. *conglobata* Ahrendt, op. cit.: 74 (1961), **syn. nov.** Type: China, Yunnan, *Maire* 1738 (holo. K, iso. E).

CHINA (E Yunnan, Guizhou). In thickets.

As can be seen from the synonymy, this species has been confused with several others. While the leaves are variable, the petals are consistently narrow and serve to distinguish this species.

70. **B. julianae** Schneider in Sargent (ed.), Pl. Wilsonianae 1:360 (1913). Type: China, W Hubei, N of Ichang (Yichang), 900–1200m, *Wilson* 417 (iso. BM, K).

Syn.: *B. julianae* var. *oblongifolia* Ahrendt in J. Linn. Soc., Bot. 57:67 (1961). Type: China, W Hubei, Chengyang, *Wilson* 535 (holo. K, iso. E).

*B. julianae* var. *patungensis* Ahrendt, op. cit.:69 (1961). Type: China, W Hubei, Patung (Badong Xian), 1300m, *Wilson* 2878 (holo. K; iso. BM, E).

CHINA (E Sichuan, Hubei). In mixed forest and along streams, 900–1700m.

The shape and breadth of the leaves are variable and offer no reliable differences between the varieties described by Ahrendt.

**71. *B. ferdinandi-coburgii*** Schneider in Sargent (ed.), Pl. Wilsonianae 1:364 (1913), p.p., excl. spec. ex Hubei. Type: China, S Yunnan, Mengtze (Mengzi), *Henry* 10257 (holo. K, iso. E).

CHINA (S Yunnan). In woods.

Specimens with this name from Hubei are referable to *B. julianae*.

**72. *B. vernalis*** (Schneider) Chamberlain & Hu, stat. nov.

Syn.: *B. ferdinandi-coburgii* Schneider var. *vernal* Schneider in Repert. Spec. Nov. Regni Veg. 46: 249 (1939). Type: China, Yunnan, near Kunming, *Schneider* 226 (holo. Herb. Dendrol. Schneider, n.v.).

CHINA (E Yunnan, around Kunming). Dry hillsides in thickets, c.2000m.

A specimen, *Henry* 10613, referred by Ahrendt (1961) to *B. zanlanscianensis*, belongs to this species.

**73. *B. victoriana*** Chamberlain & Hu, sp. nov.

Syn.: *B. wallichiana* DC. var. *gracilipes* Ahrendt in J. Bot. 79, Suppl.: 17 (1941). Type: India, Manipur, Sirohifuras, *Watt* 6449 (holo. K, iso. E).

Species similis *B. wallichianae* DC. et *B. ferdinandi-coburgii* Schneider, ab illa bracteolis et sepalis exterioribus ovato-lanceolatis, pedicellis gracilibus, 1-2.4cm longis; ab hac foliis crassioribus, spinulis paucioribus differt.

Frutex erectus ad 2m altus. Ramuli glabri, distincte sulcati, annotini, pallide lutei et parce minutissime verruculosi; vetustiores cinerascetes. Internodia 3.5-6cm longa. Spinae trifidae, concoloriae, subteretes, 1-2.5cm longae. Folia ramorum floriferorum elliptica vel oblango-elliptica, 2.5-3.5cm longa et 1.2-2.4cm lata, apice acuta, mucronata, basi ad petiolum c.1mm longum attenuata, margine spinoso-serrulata, spinulis 0.8-1.5mm longis, utrinque 5-8; utraque facie elavato-nervata, veinis lateralibus et in margine positis distincte visibilibus, supra viridia, subtus pallidiora, tenuiter coriacea; folia ramorum sterilium majora, elliptico-lanceolata, 5.5-9cm longa et 1.5-2.5cm lata, densius spinoso-serrata, spinulis utrinque 15-20(-30). Petioli c.4mm longi. Flores 8-12mm diam., 8-18 fasciculatae. Pedicelli graciles, 1.4-2.4cm longi. Bracteola ovato-lanceolata, c.2 x 1.5mm. Sepala biseriata, exteriora ovato-lanceolata, 3.5-4 x 2.5-3mm, interiora 5.5-6.5 x 3-3.5mm, apice rotundata; petala obovata, c.5 x 3.5mm, apice retusa biapiculata, basi glandulis 2, lanceolatis, 1.2-1.4cm longis praedita. Stamina c.4mm longa, a anthera anguste oblonga, apice truncata. Ovarium breviter stylosum ovulis 1 instructum. Baccae ignotae.

Type: NW Upper Burma, Mt Victoria, 2100-2700m, along the bridle path, in shade, 2 iv 1956, *Kingdon-Ward* 21911 (holo. E, iso. BM).

NW UPPER BURMA. Mt Victoria, 2600m, *Umwinn* 3034, 3041 (E); Chin Hills, 2100m, iv 1916, *Fields Clarke* 38 (E).

INDIA. Manipur, on the fringe of forest, on the W side of the ridge, *Kingdon-Ward* 17220 (BM).

NE INDIA (Manipur), NW UPPER BURMA. Forest margins, etc., 2100–2700m.

*Watt* 6449, cited above in synonymy, was referred by Ahrendt (1961) to *B. sublevi*s var. *microcarpa* but it lacks the characteristic funicle of that species.

**74. *B. atrocarpa*** Schneider in Sargent (ed.), Pl. Wilsonianae 3:437 (1917). Type: China, W Sichuan, Mupin (Baoping), *Wilson* 1284 (iso. BM, E).

Syn.: *B. atrocarpa* var. *subintegra* Ahrendt in J. Linn. Soc., Bot. 57:77 (1961). Type: China, W Sichuan, Lushan Xian, 1100m, *K. L. Chu* 4040 (holo. E; iso. BM, K).

*B. silvicola* Schneider var. *angustata* Ahrendt, op. cit.:62 (1961), **syn. nov.** Type: China, W Sichuan, Tianguan Xian, 1900m, 20 iv 1936, *K. L. Chu* 2368 (holo. E; iso. IBSC, BM).

CHINA (W Sichuan). On thickets, 1000–2300m.

**III. Subsection *Subleves*** Ahrendt in J. Bot. 79, Suppl.: 31 (1941) p.p., species typ. solum.

Shoots sulcate; leaves thinly coriaceous, epruinose; flowers in fascicles; placenta basal; ovule solitary; funicle 3–6 × as long as ovule; fruit black, stylose, epruinose or slightly pruinose. Monotypic.

Type species: *B. sublevi*s W. W. Smith.

**75. *B. sublevi*s** W. W. Smith in Notes RBG Edinb. 9:83 (1916). Type: China, SW Yunnan, around Tengyueh (Tengchong), *Forrest* 9559 (holo. E, iso. K).

Syn.: *B. sublevi*s var. *grandiflora* Schneider in Repert. Spec. Nov. Regni Veg. 46:253 (1939). Type: China, SW Yunnan, around Tengchong, *Rock* 7930 (holo. A, n.v.).

*B. sublevi*s var. *gracilipes* Ahrendt in J. Bot. 79:17 (1941). Type: NE India, Meghalaya, Khasia Hills, Motling, *Simms* 114 (holo. K).

*B. sublevi*s var. *exquisita* Ahrendt in J. Linn. Soc., Bot. 57:58 (1961). Type: China, NW of Tengyueh (Tengchong), ii 1925, *Forrest* 26196 (holo. K, iso. E).

*B. wallichiana* DC. var. *microcarpa* Hook. f. & Thomson, Fl. Ind. 1:226 (1855), **syn. nov.** Type: NE India, Meghalaya, Khasia, 5000–6000ft, *Hooker & Thomson* (iso. E).

NE INDIA (Meghalaya), N UPPER BURMA, W CHINA (SW Yunnan). River banks, side valleys on hills, in forest, 1500–2100m.

This species is unique in Sect. *Wallichianae* in its long funicle, the chief diagnostic character of this monotypic subsection.

*Taxa not seen and incompletely known*

***B. gagnepainii*** var. *subovata* Schneider in Repert. Spec. Nov. Regni Veg. 46:264 (1939). Type: China, W Sichuan, Ching chi hsien, nr Wa Wu shan, *Wilson* 2874 (n.v.).

A specimen, *C. W. Wang* 63774 (from Yunnan, Wei-si Xian), referred by Schneider to this variety, is referable to *B. phanera*.

**B. zanolanschianensis** Pamp. in Giorn. Bot. Ital. n.s. 22:293 (1915). Type: China, W Hubei, Zan-lan scian, *Silvestri* 4110 (n.v.).

*List of Excluded Taxa and Hybrids only known in Cultivation*

**B. atrocarpa** Schneider var. **longipes** Ahrendt in J. Linn. Soc., Bot. 57:77 (1961).

**B. × bristoliensis** Ahrendt in Gard. Illustr. 64:1084 (1947). *B. calliantha* × *verruculosa*.

**B. bullata** Ahrendt in J. Bot. 79, Suppl.:38 (1941).

**B. × chenaultii** Ahrendt in Gard. Chron. ser. 3, 108:56 (1940). *B. verruculosa* × *gagnepainii*.

**B. × chilternensis** Ahrendt in J. Linn. Soc., Bot. 57:52 (1961). *B. veitchii* × ?*B. verruculosa*.

**B. helenae** Ahrendt in J. Bot. 80, Suppl. 95 (1942).

**B. × hybrido-gagnepainii** Suringar in Jaarb. Ned. Dendr. Ver. 146 (1929). Syn.: *B. wokingensis* Ahrendt. in Gard. Chron. ser. 3:108 (1940).  
A hybrid of *B. gagnepainii*.

**B. × interposita** Ahrendt in Gard. Illustr. 64:1084 (1947). *B. hookeri* var. *hookeri* × *B. verruculosa*.

**B. × oxoniensis** Ahrendt in J. Linn. Soc., Bot. 57:68 (1961).

**B. pruinosa** Franchet var. **barresiana** Ahrendt in Kew Bull. 1939:266 (1939).

**B. pruinosa** var. **brevifolia** Ahrendt, op. cit.: 267 (1939).

**B. pruinosa** var. **longifolia** Ahrendt in J. Linn. Soc., Bot. 57:81 (1961).

**B. pruinosa** var. **punctata** Ahrendt, op. cit.: 82 (1961).

**B. pruinosa** var. **serratifolia** Ahrendt in J. Bot. 79, Suppl.:15 (1941).

**B. × watlingtonensis** Ahrendt in J. Linn. Soc., Bot. 57:48 (1961).

**B. × wintonensis** Ahrendt in Gard. Chron. ser. 3:108:56 (1940).

**B. wisleyensis** Ahrendt in Gard. Chron. ser. 3, 105:372 (1939).

#### ACKNOWLEDGEMENTS

This work was largely carried out during a study visit made by C. M. Hu to the Royal Botanic Garden, Edinburgh through the auspices of the Royal Society. He gratefully acknowledges the facilities provided during his visit.

We thank the Directors of the Herbaria at Kew, the British Museum and Paris for permission to consult their collections.

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